



Two new species of the family Philogeniidae (Odonata: Zygoptera) from the Western Colombian Andes

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The family Philogeniidae was recently proposed as a monophyletic clade grouping the genera *Philogenia* and *Archaeopodagrion*. Here, two new species found during recent expeditions to the Western Colombian Andes are described, *Archaeopodagrion fernandoi* sp. nov. and *Philogenia martae* sp. nov. Also, *Philogenia zeteki* is recorded for the first time in Colombia. Natural history notes, a taxonomic key for *Archaeopodagrion*, a distributional map, illustrations, photographs, and notes on the morphology of Philogeniidae are provided.

<http://zoobank.org/urn:lsid:zoobank.org:pub:965D2249-2C16-459B-83B5-2C7786ECBFC0>

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Keywords: damselfly; dragonfly; *Archaeopodagrion fernandoi*; *Philogenia martae*; *Philogenia zeteki*; Tatamá National Park; Orquídeas National Park; Farallones de Cali National Park; oviposition

Introduction

The tribe Philogeniini was first proposed by Rácenis in 1959 to include all the megapodagrionids with supplementary sectors on the wings, the origin of CuA apical to the arculus and just one row of cells between CuA and the wing margin. This tribe grouped genera from three tropical regions: Neotropical: *Philogenia*, *Heteropodagrion*, *Mesagrion*, *Dimeragrion*, *Sciotropis* and *Oxystigma*; Afrotropical: *Allolestes*, *Neurolestes* and *Nesolestes*; and Pacific: *Caledargiolestes*. On the other hand, the genus *Archaeopodagrion* was grouped with the Malagasy genus *Tataocnemis* in a different subfamily Tatoocnemidinae by Rácenis, because their lack of supplementary sectors on the wings. Recently, Dijkstra, Kalkman, Dow, Stokvis, and Van Tol (2014), using molecular data, proposed the elevation of the tribe Philogeniini to family Philogeniidae to group the genera *Archaeopodagrion* and *Philogenia*. The clade Philogeniidae was recovered as monophyletic on their hypothesis of the evolutionary relationships within Zygoptera; they recognize that these genera are substantially distinct in morphology, but share the presence of very long coiled flagella on the genital ligula. Tennissen and Johnson (2010) diagnosed the genus *Archaeopodagrion* from other South American megapodagrionid genera. They found it shares a long quadrangle and petiolation beyond the cubito-anal crossvein (to mid-level of the quadrangle) with the genera *Oxystigma* and *Philogenia*, but they did not find any unique characteristic shared only between *Archaeopodagrion* and *Philogenia*.

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Table 1. *Philogenia* species recorded in Colombia with their IUCN category.

Species	Country	Region	IUCN Category
<i>Philogenia berenice</i> Higgins, 1901	Colombia and Peru	Amazon	DD
<i>Philogenia cassandra</i> Hagen, 1862	Colombia, Ecuador, Peru and Venezuela	Cordillera de la Costa, Orinoco and Amazon	LC
<i>Philogenia cristalina</i> Calvert, 1924	Colombia	Cordillera Central	VU
<i>Philogenia ebona</i> Dunkle, 1986	Colombia	Chocó	DD
<i>Philogenia helena</i> Hagen, 1869	Colombia and Venezuela*	Cordillera Oriental and Serranía de Perijá*.	NT
<i>Philogenia raphaela</i> Selys, 1886	Colombia	?	DD
<i>Philogenia sucre</i> Dunkle, 1986	Colombia	Cordillera Oriental	DD

Sources: Calvert (1924), Bick and Bick (1988), Bota-Sierra, Moreno-Arias, and Faasen (2015), Bota-Sierra et al. (2016); *De Marmels (personal communication, 6 April 2017).

The Family Philogeniidae groups 38 species: three in the genus *Archaeopodagrion* and 35 in the genus *Philogenia*. All are forest inhabitants, usually associated to first or second order streams; their distributions are limited in comparison with other Neotropical damselflies, with the majority of species endemic to a single basin.

The genus *Archaeopodagrion* includes three species from the eastern Ecuadorian Andes, two of them described by Kennedy: the type species, *Archaeopodagrion bicorne* Kennedy, 1939, which impressed the author by the simplicity of its wing venation; and the enigmatic *Archaeopodagrion bilobatum* Kennedy, 1946, which is only known from the type specimen. In 2010, Tennessen and Johnson described *Archaeopodagrion armatum* from southern Ecuador. The larva of this genus remains unknown.

The genus *Philogenia* was described in 1862 by Selys to include the species *Philogenia margarita*. In 1924 Calvert revised the genus for the first time, and added six new species to the 11 previously defined. Later, Bick and Bick (1988) revised the genus again and subdivided it into six groups, adding five new species to the 22 previously known, raising the number to 27. Since then, nine species have been described or recognized as valid (Brooks, 1989; Cook, 1989; Donnelly, 1989; Dunkle, 1990a, 1990b; Machado, 2013; von Ellenrieder, 2003). Of these 36 species, seven species are recorded in Colombia, from which four are rare endemic species (Table 1).

Here, I describe and provide natural history notes for two new species from the Pacific Ocean slope of the Andean mountain range Cordillera Occidental in Colombia: *Archaeopodagrion fernandoi* sp. nov., found 850 km north of its Ecuadorian congeners, and *Philogenia martae* sp. nov., the third species of this genus found in the western Andean slope, contributing to the Odonata knowledge of this rich and poorly unexplored region.

Material and methods

All specimens are deposited in the Colección de Entomología de la Universidad de Antioquia (CEUA), Medellín-Colombia. For diagnosis, the papers by Calvert (1924), Kennedy (1939, 1941, 1946), Westfall and Cumming (1956), Dunkle (1986), Bick and Bick (1988), von Ellenrieder (2003) and Tennessen and Johnson (2010) were used. In addition, specimens of the family Philogeniidae and Megapodagrionidae *sensu lato* were examined at CEUA and Colección Entomológica del Instituto de Ecología, A. C., Xalapa (IEXA). For descriptions, measurements were taken using graph paper and a stereoscope grid. Total length and abdominal length do not include appendages. Drawings were made freehand with the aid of an AM Scope stereoscope and its grid (Irvine, Canada). Field photographs were taken with a SONY RX iii camera. Laboratory photographs were taken with a Nikon stereoscope SMZ25 and its

mounted Nikon DS-U3 camera, and processed with the program NIS elements AR version 4.5 (https://www.nikoninstruments.com/es_AMS/Productos/Software/NIS-Elements-Advanced-Research/NIS-Elements-Viewer). The map was composed using Shuttle Radar Topographic Mission digital elevation models with 30 m spatial resolution, downloaded from <http://srtm.csi.cgiar.org> (Jarvis, Reuter, Nelson, & Guevara, 2008), and a shape file of Colombian departmental political divisions, using ArcGIS 10.1 and ArcMAP 10.1 (<http://www.arcgis.com>). Elevation data and longitude/latitude coordinates were taken in the field with a Garmin Etrex GPS. Abbreviations for structures are as follows: FW: forewing; HW: hind wing; pt: pterostigma; Px: postnodal cross veins; S1–10: abdominal segments one to 10. Terminology follows Garrison, von Ellenrieder, and Louton (2010).

Results

During the identification process, *Philogenia zeteki* Westfall and Cumming, 1956 was found among other material at CEUA. Previously, this species was known only from Panama. Herein, I provide the first record for Colombia, one male and one female from Chocó department, Acandí municipality, Capurganá township, 8.620138° N, 77.361467° W, 20 m asl, 12 October 2009, Leg. J. Cardona and C. Bota-Sierra (Figure 1). This finding and the two new species described below rise the number of Philogeniidae present in Colombia to 10.

Archaeopodagrion fernandoi sp. nov.

Etymology

Named fernandoi after Dr Fernando Jesús Muñoz Quesada, devoted trichopterologist, whose kind teachings and advice inspired several students to work with aquatic insects.

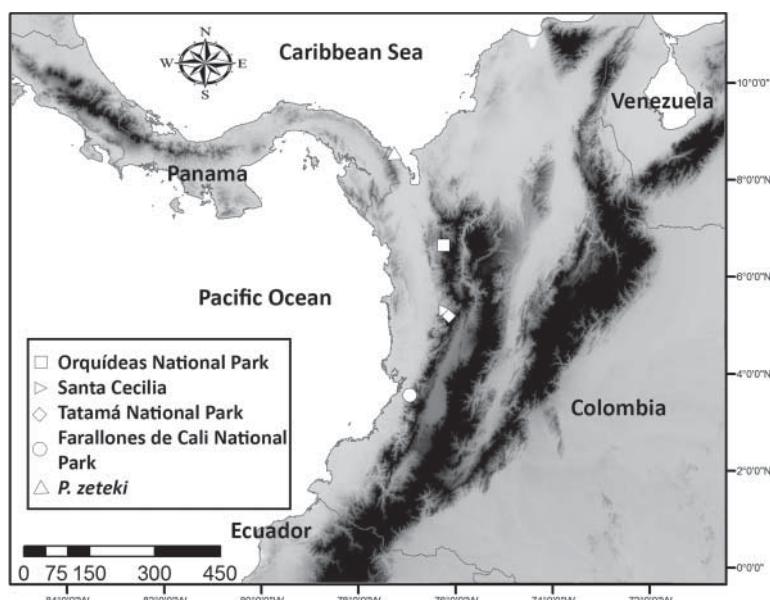


Figure 1. Map showing the localities where *A. fernandoi*, *P. martae*, and *P. zeteki* are recorded.

Material examined

Twenty-three males, 12 females.

CEUA material. COLOMBIA, Risaralda Department, Tatamá National Park, Pueblo Rico Municipality, Monte Bello Township. Holotype (M#): La Escuela stream, 5.22717° N, 76.08283° W 1385 m asl, 29 September 2016, Leg: C. Bota-Sierra. Allotype: Minas de Cuarzo stream, 5.2286° N, 76.09806 W, 1480 m asl, 17 September 2014, Leg: M. Loaiza, A. Chinome, C. Flórez and C. Bota-Sierra.

Paratypes. COLOMBIA, Antioquia Department, Orquídeas National Park, Frontino Municipality, El Santiago river, 6.62695° N, 76.21687° W, 1855 m asl, 4M#, 10–18 August 2016, Leg: Y. Correa-C. and A. Pérez. Risaralda Department, Tatamá National Park, Pueblo Rico Municipality, Monte Bello Township: La Clarita stream, 5.24308° N, 76.09630° W 1589 m asl, 1M#, 16 April 2014. Leg: C. Bota-Sierra. Minas de Cuarzo stream, 5.22861° N, 76.09805° W 1480 m asl, 2M#, 17 September 2014, Leg: M. Loaiza, A. Chinome, C. Flórez and C. Bota-Sierra. La Guagua stream at Taibá River Canyon, 5.21632° N, 76.08850° W, 1680 m asl, 1M#, March 2015, Leg: C. Bota-Sierra; Don Antonio stream at Taibá River Canyon, 5.21833° N, 76.08681° W, 1666 m asl, 2M# and 2 F#, 24 March 2015. Leg: C. Bota-Sierra; 2M# and 2 F#, 16 August 2016, Leg: J. Sandoval and C. Bota-Sierra; 3M# and 1F#, 25 January 2017, Leg: J. Sandoval and C. Bota-Sierra; 3M# and 2F#, 25 February 2017, Leg: J. Sandoval, D. Ayala, M. Vigano and C. Bota-Sierra. La Escuela stream, 5.22717° N, 76.08283° W, 1385 m asl, Leg: 2M# and 2 F#, 27 July 2016, 1M# and 3F#, 30 August 2016. 3M# and 1F#, 22 January 2017, all Leg: J. Sandoval and C. Bota-Sierra.

Male holotype

Head. Black except: labrum cream colored; labium, base of mandible, gena, anteclypeus, antennal socket, first antennomere and two symmetrical spots between antennae base and central ocellus, bluish white. Posterior part of frons sculptured, hence appearing duller (Figures 2a, 3a–c, e). Frons rounded. Postocular lobe slightly protruding backwards beyond level of hind margin of compound eye. Paraorbital carina distinct (Figures 2a, 3a–c, e).

Thorax. Prothorax black with two pale spots on anterior lobe, and pale pleura, posterior prothoracic lobe developed into a pair of large recurved flaps (Figures 2c, f, 3a, c, e). Pterothorax yellowish blue except: middorsal stripe, mesepimeron, metepisternal stripe and a small stripe on the posterior fourth of metepimeron which are dark brown (Figure 3a–c, e). Coxae and internal surface of legs yellowish green, external surface brown (Figure 3a–c, e). Nine spurs on external side of right metafemur and six on left metafemur, as long as the space between them or shorter, gradually increasing in size toward apex. Eight spurs on anterior side of right metatibia and seven on left metatibia, longer than space between them, gradually decreasing in size toward apex. Tarsal claws with developed supplementary tooth. Wings hyaline. Pt dark brown surmounting one and a half to two cells, ratio between distal and proximal length about 1:1. Px right 16/left 17 in FW, Px 14 in HW.

Abdomen. Black except pale areas as follows: distal transverse stripe on S1, S7–9; incomplete apical rings on S3–7; sides of S1–2; a ventrolateral stripe on S3 and ventrolateral half on S7–8 (Figure 3a–c, e). Genital ligula with long paired coiled flagella on distal segment, similar to the other species of genus (Figure 2e). Cercus long and curved with blunt apex (Figure 2h, i, k, l). Paraproct long and pointed, curving upwards, with a middorsal tubercle bearing a hair pencil (Figure 2h, i, k, l).

Measurements (mm): FW = 28.5; HW = 27.5; abdomen = 35; total length = 45.

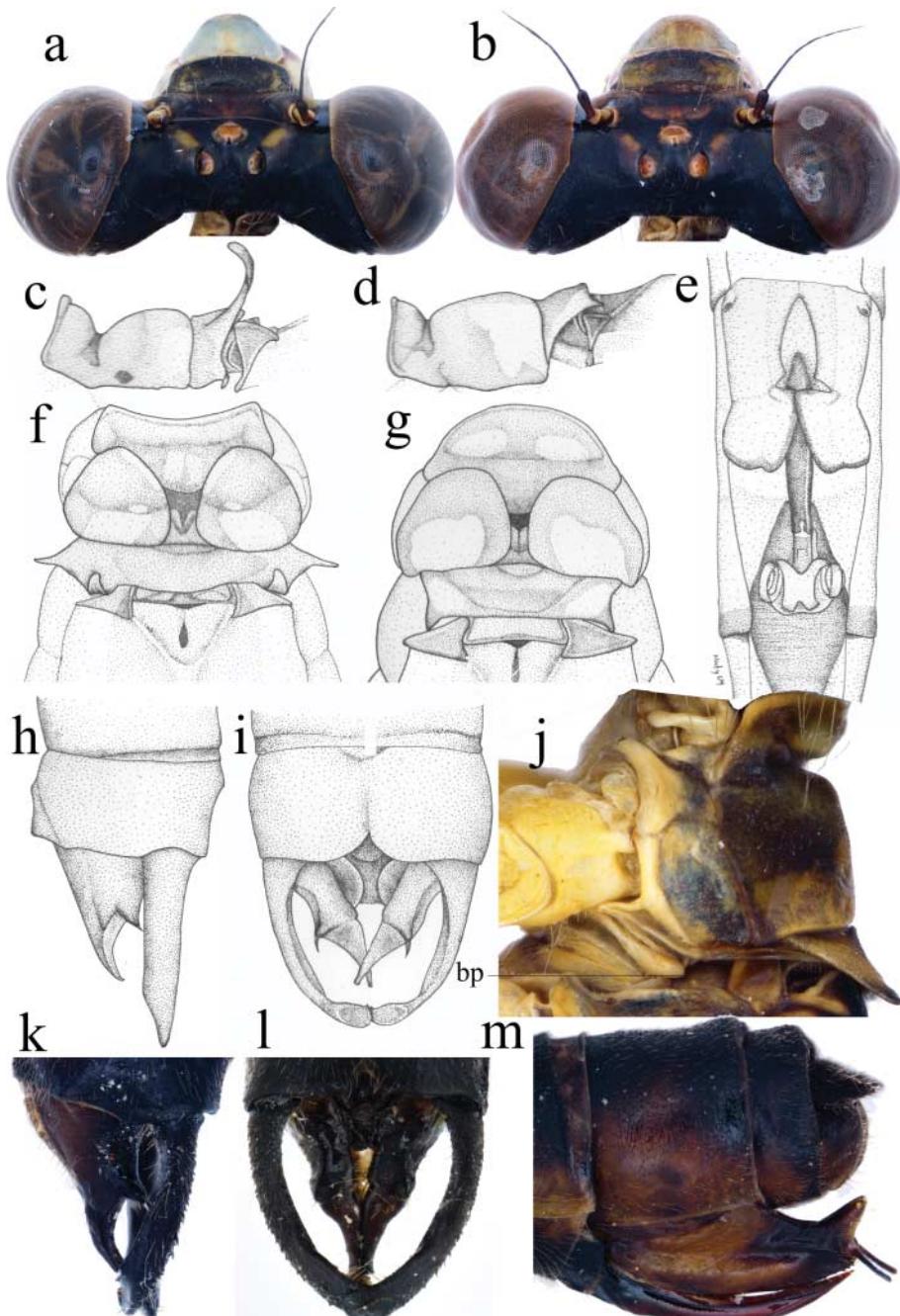


Figure 2. *Archaeopodagrion fernandoi*: male paratype from Tatamá: (a) head; (c) pronotum lateral view; (e) S1–3 ventral view; (f) pronotum dorsal view; (h) S10 and caudal appendages lateral view; (i) S10 and caudal appendages dorsal view. Male paratypes from Orquídeas: (k) caudal appendages lateral view; (l) caudal appendages dorsal view. Female paratypes from Tatamá: (b) Head; (d) pronotum lateral view; (g) pronotum dorsal view; (j) prothorax in lateral view; (m) S9–10 in lateral view. bp = blunt little point at dorsal end of intersternite. Hand-drawn illustrations by Natalia Uribe.



Figure 3. *Archaeopodagrion fernandoi* from Tatamá: Males: (a) lateral view; (b) frontolateral view; (c) dorsal view; (d) dorsolateral view. Females: (e) frontolateral view; (f) ovipositing in dead wood.

Allotype

Similar to holotype (Figures 2b, 3d, f), except for the following.

Thorax. Posterior lobe of pronotum with lateroapical pointed processes (Figure 2d, g, j). Dorsal end of intersternite rounded with a blunt little point (Figure 2j). Ten spurs on anterior side of right metafemur and 11 on left metafemur, seven spurs on anterior side of metatibia. Pt surmounting two cells, ratio between distal and proximal length about 1:1. Px in FW: right 18/left 19, Px in HW: right 16/left 17.

Abdomen. Pale ventrolateral stripes on S4–5, dorsum of S8 and S9 dull brown (Figure 3d, f). Genital valves brown on base and black from the middle to the apex, with a big pointed brown

process over the base of stylus, a row of five small blunt ventral denticles, and black slender and long stylus. Black conical cercus and brown rounded paraprocts (Figure 2 m).

Measurements (mm): FW = 29.5; HW = 28.5; abdomen = 36; total length = 45.

Variation among paratypes

Light colors become duller with age.

Males. Paraprocts of males collected at Orquídeas National Park are longer than those of males from Tatamá National Park (Figure 2 h, i, k, l). Six to 10 spurs on metafemora. Six to 10 spurs on anterior side of metatibiae. Px in FW 16–19, Px in HW 15–19. *Measurements:* FW: 25–28.5; HW: 24.1–27.4; abdomen: 30.5–35; total: 40.2–45.

Females. Eight to 11 spurs on metafemora. Seven to 9 spurs on anterior side of metatibiae. Px in FW 18–21, Px in HW 15–19. *Measurements:* FW: 27.1–30; HW: 26.2–28.9; abdomen: 31–34.1; total = 39.3–42.

Key to males of Archaeopodagrion

- 1 Paraproct with tubercle bearing a hair pencil (Figure 2 h, i, k, l); Colombia and Ecuador 2
- 1' Paraproct lacking tubercle bearing a hair pencil; Ecuador 3
- 2 Paraproct apex with two pointed processes; Ecuador *A. armatum*
- 2' Paraproct apex ending in a single process (Figure 2 h, i, k, l); Colombia (Figure 1) *A. fernandoi*
- 3 Cercus with an internal sharp tooth at midlength; cercus slightly curved on lateral view *A. bicorne*
- 3' Cercus with an internal sharp tooth at basal fourth of its length; cercus strongly curved on lateral view *A. bilobatum*

Key to females of Archaeopodagrion

Note: the female of *A. bilobatum* remains unknown (von Ellenrieder, Mauffray, & Tennessem, 2016).

- 1 Posterior lobe of pronotum with projections at posterolateral corners (Figure 2d, g); Colombia and Ecuador 2
- 1' Posterior lobe of pronotum with paired large, recurved and quadrate processes along posterior margin; Ecuador *A. armatum*
- 2 Posterolateral projections on posterior lobe of pronotum wide and rounded; Ecuador *A. bicorne*
- 2' Posterolateral projections on posterior lobe of pronotum thin and pointed (Figure 2d, g); Colombia (Figure 1) *A. fernandoi*

Diagnosis

Males of *Archaeopodagrion fernandoi* have two paired long pointed processes on pronotum posterior lobe (Figure 2c, f), a unique character within the genus. Caudal appendages resemble those of *A. armatum* because of the presence of a tubercle bearing a hair pencil at midlength of paraproct, and the absence of a well-developed internal tooth in cercus (Figure 2 h, i, k, l), present in the other two species of the genus. Nevertheless, they can be easily separated by the two apical

Table 2. Species of Zygoptera ovipositing into dead wood.

Family	Species	Source	Distribution
Calopterygidae	<i>Hetaerina aurora</i> Ris, 1918	Bota-Sierra, personal observations	Neotropical
Chlorocyphidae	<i>Chlorocypha consueta</i> (Karsch, 1899)	González-Soriano and Verdugo-Garza (1984)	Afrotropical
	<i>Platycypha caligata</i> (Selys, 1853)	Robertson (1982)	Afrotropical
	<i>Platycypha fitzimonsi</i> Pinhey, 1950	González-Soriano and Verdugo-Garza (1984)	Afrotropical
	<i>Rhinocypha unimaculata</i> (Selys, 1853)	González-Soriano and Verdugo-Garza (1984)	Indomalaya
Megapodagrionidae	<i>Teinopodagrion venale</i> (Selys, 1862)	De Marmels (2001)	Neotropical
Polythoridae	<i>Cora cyane</i> (Selys, 1853)	González-Soriano and Verdugo-Garza (1984)	Neotropical
	<i>Cora marina</i> Selys, 1868	González-Soriano and Verdugo-Garza (1984)	Neotropical
	<i>Euthore fasciata</i> (Hagen, 1853)	Bota-Sierra, personal observations	Neotropical
	<i>Miocora peraltica</i> Calvert, 1917	Bota-Sierra, personal observations	Neotropical
	<i>Polythore gigantea</i> (Selys, 1873)	Bota-Sierra, personal observations	Neotropical

pointed processes on paraproct of *A. armatum*, compared to the single process in *A. fernandoi* (Figure 2 h, i, k, l), and the more curved cercus with the apex flattened and rounded in dorsal view of *A. fernandoi* (Figures 2 h, i, k, l, 3c), compared with the less curved cercus with indentations in internal side at apex in dorsal view of *A. armatum*. Females of *A. fernandoi* can be distinguished by the unique posterior lobe of pronotum which has posterolateral narrowly pointed processes (Figure 2d, g), which in *A. armatum* are enlarged occupying most of posterior margin and are wider and rounded in *A. bicorne*. Structure of intersternite (Figure 2j), which could offer valuable taxonomic information, is unknown for *A. armatum* and only briefly mentioned for *A. bicorne*.

Biology

This species inhabits forested stony mountain streams of first or second order, sometimes it is found along higher order streams in areas where the streams split into two branches, of which the branch with less water is usually chosen. Individuals usually perch in shadowed branches where their colors help them to camouflage very well (Figure 3a–e). One female was observed ovipositing alone into dead wood above a stream (Figure 3f); oviposition in this substrate is suggested as an answer to the lack of emergent vegetation in this kind of streams (Robertson, 1982), and it is reported for other species of Zygoptera inhabiting similar places in Africa, America and Asia (Table 2).

Distribution

Archaeopodagrion fernandoi is recorded from the Pacific Ocean slope of the Cordillera Occidental in Colombia, at two natural national parks, Tatamá and Orquídeas in the departments of Risaralda and Antioquia respectively, between 1300 and 1900 m above sea level (Figure 1).

Philogenia martae sp. nov.

Etymology

Named *martae* after Dr. Marta Isabel Wolff Echeverri, devoted dipterologist, whose love for insects led to the foundation of the Entomological Collection of the University of Antioquia (CEUA), and her passion for entomology has been an inspiration for several students.

Material examined

Twenty-seven males, 14 females

Material deposited at CEUA: COLOMBIA, Risaralda Department, Tatamá National Park, Pueblo Rico Municipality, Monte Bello Township, 5.24813° N, 76.08253° W, 1170 m asl, Leg: C. Bota-Sierra: Holotype (M#): 11–15 April 2015. Allotype: 23 February 2015. Paratypes: 2M#, 23 February 2015, Leg: C. Bota-Sierra; 4M# and 2F#, 11–15 April 2015; 3M#, 21 June 2016, Leg: D. Ayala, A. Orejuela y C. Bota-Sierra; 1M# and 1F#, 21 July 2016, Leg: F. Garcia, J. Sandoval and C. Bota; 6M# and 1 F#, 17 August 2016, Leg. J. Sandoval and C. Bota-Sierra; 7M# and 1 F#: 27 August 2016, Leg: J. Sandoval. and C. Bota-Sierra; 3F#, 28 January 2017, Leg: C. Bota-Sierra. Santa Cecilia Township: Cinto stream, 5.34999° N, 76.15123° W, 442 m asl, 13 February 2017, Leg: B. Cardenas, J. Sandoval and C. Bota-Sierra; Alto Amurupá Reserve: Trail to Ranas de Cristal stream, 5.32150° N, 76.16987° W, 780 m asl, 1M#, 19 September 2016, Leg: B. Cardenas, C. Flórez, and C. Bota-Sierra. 1 F#, 23 September 2016, Leg: C. Flórez and C. Bota-Sierra. 1M# and 1F#, 31 January 2017, Leg: J. Sandoval and C. Bota-Sierra; 1M#, 12 February 2017, Leg: J. Sandoval and C. Bota-Sierra; 1F#, 18 February 2017, Leg: J. Sandoval and C. Bota-Sierra. Mumburuto stream, 5.32810° N, 76.16499° W, 510 m asl, Leg: J. Sandoval and C. Bota-Sierra: 1F#, 7 February 2017; 1 F#, 11 February 2017.

Male holotype

Head. Black with labium, mandibular base and basal half of genae yellow (appearing as a yellow smile), antennal socket yellow, brown tinge between base of antennae and lateral ocelli, postocular area iridescent, rear of head dull yellow (Figures 4a, 5a). Frons rounded. Postocular lobes slightly protruding backwards beyond level of hind margin of compound eyes. Marked paraorbital carina (Figure 4a).

Thorax. Prothorax black with anterior lobe and laterodorsal portions bronze and gray (Figure 5a), posterior prothoracic lobe rounded. Pterothorax black except for wide coppery red antehumeral stripe; dull yellow thin stripe at humeral suture, metepisternal and metepimeral stripes, and venter (Figure 5a). Coxae and internal surface of legs gray, external surface brown (Figure 5a), armature brown. Eleven spurs on anterior side of metafemora, as long as space between them or longer, gradually increasing in size toward apex. Ten spurs on anterior side of right metatibia and 11 on left metatibia, longer than space between them, gradually decreasing in size toward apex. Tarsal claws with developed supplementary tooth. Wings hyaline. Pt brown surmounting six cells in left FW and five cells in the other wings, ratio between distal and proximal length about 1:1. Px in FW: right 27/left 28, Px in HW: right 24/left 26.

Abdomen. Black except of a pair of dorsolateral gray spots on S1 and S3, and incomplete gray apical rings on S3–S7 (almost black on S6 and S7), pruinescent white spot on posterior half of dorsum of S8–10 (Figure 5a). Genital ligula with long paired coiled flagella on distal segment, similar to the other species of the genus (Figure 4i). Cercus in lateral view with a midventral indentation on external border (Figure 4f) and mesoventral process extended at its proximal end directed toward the base of the appendage (Figure 4f–h), length of cercus approximately ¾ of paraproct length (Figure 4f–h). Paraproct apex dull pointed, diverging from each other (Figure 4f–h).

Measurements (mm): FW = 37; HW = 37; abdomen = 47; total = 59.

Allotype

As holotype (Figure 5b), except for the following.

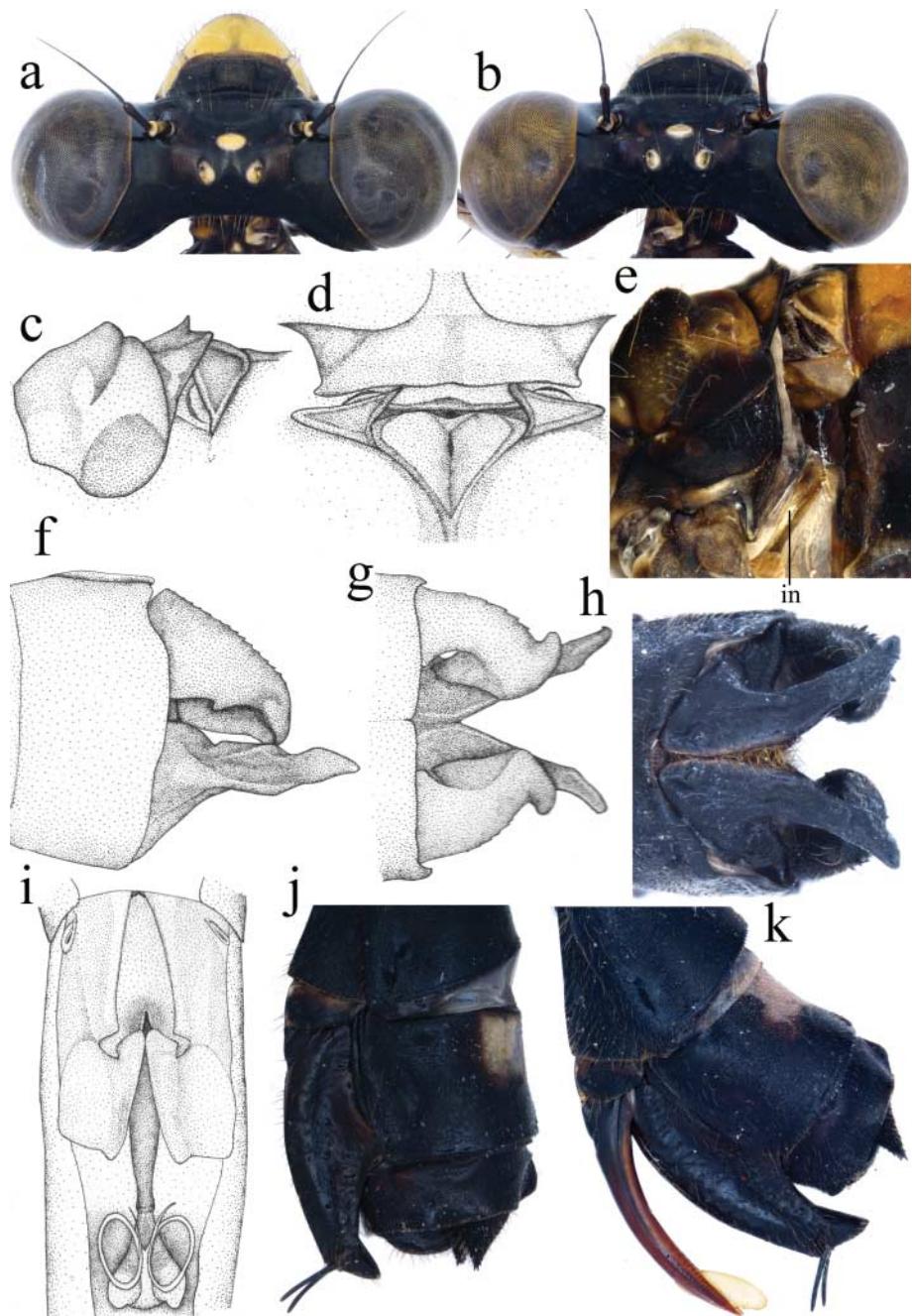


Figure 4. *Philogenia martae*: male paratype from Tatamá: (a) head; (f) S10 and caudal appendages lateral view; (g) S10 and caudal appendages dorsal view; (h) S10 and caudal appendages ventral view; (i) S1–2 ventral view. Female paratypes from Tatamá: (b) head; (c) pronotum lateral view; (d) posterior lobe of pronotum and mesostigmal plates dorsal view; (e) prothorax in lateral view; (j, k) S9–10 in lateral view, (k) with an egg in ovipositor. in = interstermite. Hand-drawn illustrations by Natalia Uribe.



Figure 5. *Philogenia martae* from Tatamá: (a) male lateral view; (b) female dorsolateral view.

Head. Yellow colors on face duller (Figure 4b).

Thorax. Posterior lobe of pronotum with dorsolateral pointed process (Figure 4c–e). Dorsal end of intersternite rounded with a blunt point (Figure 4e). Thirteen spurs on left and 12 on right anterior side of metafemora. Thirteen spurs on anterior side of right metatibia and 14 on left metatibia. Px in FW: right 33/left 31, Px in HW: right 26/28 left.

Abdomen. Dorsoposterior portion of S8 is a white membrane (approximately $\frac{1}{4}$ of the length of the sclerotized portion), dorsobasal half of S9 white, S10 black without pruinescence (Figures 4j, k, 5b). Black genital valves, with a big pointed process above the base of stylus, the latter long and slender. Cercus black, conical with two apical minute sharp denticles. Paraproct black, rounded, rudimentary (Figure 4j, k).

Measurements (mm): FW = 38; HW = 37.5; abdomen = 45; total length = 55.

Variation among paratypes

Males. In some cases paraprocts are slightly asymmetrical. Eleven to 13 spurs on metafemora. Ten to 12 spurs on anterior side of metatibia. Px in FW 27–31, Px in HW 24–29. **Measurements:** FW = 35–40; HW = 35–40; abdomen = 39–51; total = 49–62.

Females. Cercus with one or two sharp apical denticles (Figure 4j, k). Light colors become duller with age. Nine to 13 spurs on metafemora; 10–14 spurs on anterior side of metatibia. Px in FW 26–33, Px in HW 23–28. **Measurements:** FW = 32–40; HW = 32–40; abdomen = 35–43; total length = 44–54.

Diagnosis

Philogenia martae is the only species in the genus in which male paraproct is longer than cercus by at least $\frac{1}{4}$ of cercus length. Bick and Bick's (1988) championi group is characterized by the presence of the mesoventral process of the cercus extending from the proximal end to the base of the appendage, as in *P. martae* (Figure 4g); in this group we find seven species, most of them distributed northwest of the Andes, in Colombia, Panama and Costa Rica: *P. ebona* in Colombia; *Philogenia augusti* Calvert, 1924 and *Philogenia leonora* Westfall & Cumming, 1956 in Panama, *Philogenia carrilica* Calvert, 1907 and *Philogenia championi* Calvert, 1901, shared by Panama

and Costa Rica; and *Philogenia terraba* Calvert, 1907 endemic to Costa Rica; only *Philogenia silvarum* Ris, 1918, is distributed east of the Andes in Peru. The straight tips of paraprocts in lateral view of *P. martae* (Figure 4 g) separate this species of *P. leonora* which paraprocts bend 90° upward just anterior to apex. The diverging tips of the paraprocts of *P. martae* (Figure 4 g, h) separate this species from *P. carrilica*, *P. championi* and *P. terraba*. The blunt apex of paraproct in *P. martae* separates it from *P. augusti* with bifurcated apex and *P. silvarum* with pointed apex (Figure 4f-h). *P. ebona* has the same brown oval spot on the mesepisternum (Figure 5a), but can be easily separated from *P. martae* by the large triangular dorsal tooth on paraprocts of *P. ebona* (absent in *P. martae*; Figure 4g). Among *Philogenia* the females of 15 species remain unknown, including the females of *P. championi* and *P. ebona* in the championi group. The females of *P. martae* can be distinguished from the described females in the championi group by its unique posterior margin of the hind lobe of pronotum which is concave in *P. martae* (Figure 5c-e) and convex in all the other species. Also, the laterodorsal blunt tips directed laterad of *P. martae* (Figure 5d) are unique among the championi group; *P. augusti* females also have laterodorsal blunt tips but these are posteriorly directed. I provide illustrations and photographs of features that are of taxonomic use as the structure of prothorax (posterior lobe of pronotum and intersternite), the last abdominal segments and general color pattern which are of diagnostic help and will be of use when describing all the unknown females in the genus (Figures 4b-e, j, k, 5b).

Biology

P. martae inhabits mountain forests, where it is found in the understory, flying and perching close to the ground (Figure 5a, b), where it is hard to observe. Males are commonly found in muddy seeps, which suggests this as their breeding habitat.

Distribution

Endemic to the Pacific Ocean slope of the Cordillera Occidental in Valle del Cauca and Risaralda departments in Colombia, and from Farallones the Cali National Park in the Anchicayá River Basin, 3.56401° N, 76.87773° W (where it was observed and photographed by C. Bota-Sierra) to Alto Amurrupá reserve (Figure 1).

Discussion

A complete morphological survey looking to find more morphological characteristics that could be shared only by *Archaeopodagrion* and *Philogenia* was performed, comparing with specimens of the genera *Heteragrion*, *Heteropodagrion*, *Mesagrion*, *Paraphlebia* and *Teinopodagrion* (which were available at CEUA and IEXA). For other genera present in the Neotropics I used literature sources such as Heckman (2008), Garrison et al. (2010), and some original descriptions; for some characters I asked Jürg De Marmels, Natalia von Ellenrieder and Rosser Garrison to check among the specimens in their collections. However, no new morphological characters were found to support Philogeniidae as a family. The characters with diagnostic value mentioned for *Archaeopodagrion* by Tennissen and Johnson were all shared by at least one of the genera not included in Philogeniidae by Dijkstra et al. (2014). The only exclusive morphological character remaining to support the group Philogeniidae is the long coiled flagella of genital ligula (Figures 2e, 3i). The description of the larvae of the genus *Archaeopodagrion* could be a key stone, adding more evidence to check the monophyly of Philogeniidae.

Dijkstra et al. (2014) presented an extensive taxa sample including representative species for 10 of the 14 described genera in the family Megapodagrionidae *sensu lato* known in the Neotropics: *Archaeopodagrion*, *Dimeragrion*, *Heteragrion*, *Heteropodagrion*, *Oxystigma*, *Paraphlebia*, *Philogenia*, *Sciotropis*, *Teinopodagrion* and *Thaumatoneura*. Nevertheless, this phylogenetic hypothesis lacks support for the relationships between most of the clades of 'Calopterygoidea'. This will probably change with future studies including more species sampling, and more or different molecular and morphological characters may show a different topology. The family *Philogeniidae*, as recently defined, may not be sustained.

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